

**WHAT IS CLAIMED IS:**

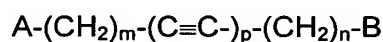
1. A method of imaging, measuring and displaying a 3-dimensional dose distribution of an energy field in a translucent 3-dimensional object comprising:

- (a) applying an energy field to the object such that the optical properties are changed upon receipt of the energy;
- (b) optically scanning the object at various positions and angles to provide a series of 2-dimensional representations of the object;
- (c) detecting the measuring light projection data indicative of optical changes in the object;
- (d) calibrating the optical change in the object to the dose of the energy corresponding to each position scan;
- (e) mapping the dose of the energy in the object and
- (f) visually recording the summation of said 2-dimensional representations on an image display receiver comprising a radiation activated metal salt of a crystalline, thermochromic polyacetylene having a conjugated structure uniformly distributed in a rigid or high density semi-solid matrix by a color alteration due to polymerization of the activated polyacetylene to provide a permanent, 3-dimensional image of the object in high spatial resolution.

2. An image display receiver displaying a colored 3-dimensional representation of an object which comprises a homogeneous rigid or high density semi-solid composition derived from a polymerized metal salt of a crystalline, thermochromic polyacetylene having a conjugated structure uniformly dispersed in a rigid or high density semi-solid matrix.

3. An image display receiver for development of a 3-dimensional representation of an object which comprises a metal salt of a polymerizable, crystalline, thermochromic polyacetylene having a conjugated structure which is uniformly distributed in a rigid or high density semi-solid matrix.

4. The image display receiver of claim 2 wherein said crystalline polyacetylene is a  $C_2$  to  $C_{10}$  radiochromic monomer having the formula:



wherein m and n each independently have a value of from 0 to 30; p has a value of 2 to 4; A and B each independently are R,  $OR_1$ , OH,  $COOR_2$ ,  $CONR_3R_4$  or  $(CH_2)_r-O-CO-NR_5R_6$  or a metal salt of the acid or ester; and where R,  $R_1$ ,  $R_2$ ,  $R_3$ ,  $R_4$ ,  $R_5$  and  $R_6$  are each independently hydrogen or  $C_1$  to  $C_{12}$  alkyl or aryl and r has a value of from 1 to 4.

5. The image display receiver of claim 2 wherein the metal salt of the crystalline polyacetylene is a lithium salt.

6. The image display receiver of claim 4 wherein said crystalline polyacetylene comprises a mixture of at least two of said monomers.

7. A radiation sensitive material comprising a C<sub>2</sub> to C<sub>10</sub> radiochromic monomer having the formula:



wherein m and n each independently have a value of from 0 to 30; p has a value of 2 to 4; A and B each independently are R, OR<sub>1</sub>, OH, COOR<sub>2</sub>, CONR<sub>3</sub>R<sub>4</sub> or (CH<sub>2</sub>)<sub>r</sub>-O-CO-NR<sub>5</sub>R<sub>6</sub> or a metal salt of the acid or ester; and where R, R<sub>1</sub>, R<sub>2</sub>, R<sub>3</sub>, R<sub>4</sub>, R<sub>5</sub> and R<sub>6</sub> are each independently hydrogen or C<sub>1</sub> to C<sub>12</sub> alkyl or aryl and r has a value of from 1 to 4,

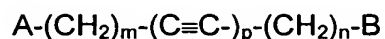
provided that at least one of A or B is COOH;

an organic base; and

a water soluble lithium salt,

wherein the weight ratio of said lithium salt to said radiochromic monomer is 0.2:1 to 0.8:1.

8. The method of claim 1 wherein said crystalline polyacetylene is a C<sub>2</sub> to C<sub>10</sub> radiochromic monomer having the formula:



wherein m and n each independently have a value of from 0 to 30; p has a value of 2 to 4; A and B each independently are R, OR<sub>1</sub>, OH, COOR<sub>2</sub>, CONR<sub>3</sub>R<sub>4</sub> or (CH<sub>2</sub>)<sub>r</sub>-O-CO-NR<sub>5</sub>R<sub>6</sub> or a metal salt of the acid or ester; and where R, R<sub>1</sub>, R<sub>2</sub>, R<sub>3</sub>, R<sub>4</sub>, R<sub>5</sub> and R<sub>6</sub> are each independently hydrogen or C<sub>1</sub> to C<sub>12</sub> alkyl or aryl and r has a value of from 1 to 4.

9. The method of claim 1 wherein the metal salt of the crystalline polyacetylene is a lithium salt.